

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	Attorney Docket No. 2006_1143A
Ryosuke NISHIDA et al.	:	Confirmation No. 4981
Serial No. 10/587,147	:	Group Art Unit 1741
Filed July 24, 2006	:	Examiner Dennis R. Cordray
MOISTURE ABSORPTIVE AND DESORPTIVE PAPER AND A METHOD FOR MANUFACTURING THE SAME	:	Mail Stop: AMENDMENT

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DECLARATION UNDER 37 CFR 1.132

I, Ryosuke NISHIDA, declare that I am a citizen of Japan, and my address is 122-2, Haji, Osafune-cho, Setouchi-shi, Okayama 7014264, Japan;

That my education and employment history is as follows:

I was graduated in March, 1983 from Okayama University, Faculty of Engineering, Department of Synthetic Chemistry, Okayama, Japan;

I was graduated in March, 1985 from Okayama University, Graduate School of Engineering, Okayama, Japan;

I was graduated in March, 2001 from Okayama University, Graduate School of Natural Science and Technology, PhD course, Okayama, Japan;

I was employed in April, 1985 by JAPAN EXLAN COMPANY LIMITED, and have been working on chemistry;

That the following argument was conducted under my supervision:

Reasons why it is impractical to reduce non-potassium cation concentration in water to "not more than 1ppm"

Indeed, it is impractical to reduce non-potassium cation concentration in water to "not more than 1ppm". The reasons thereof are as follows.

Natural water, tap water and industrial water contain many cations. For example, concentration of cations contained in industrial water is 50-100ppm (please see paragraph [0017] of the present specification). Cations contained in such water mainly consist of calcium ion and magnesium ion. Thus, in order to obtain water having non-potassium cation concentration of not more than 1ppm, it is necessary to subject such water to some treatment such as distillation or ion-exchange.

In paper-making process of paper-making industry, large amount of underground water or industrial water is used. If such water is replaced by water having non-potassium cation concentration of not more than 1ppm, distillation or ion-exchange equipment on large scale is necessary, which inevitably leads to large amount of investment. In addition, large labor and cost are required for maintaining the distillation or ion-exchange equipment.

From these reasons, it is impractical to reduce non-potassium cation concentration in water to "not more than 1ppm".

Unexpected result caused by the present invention

In order to demonstrate unexpected result caused by the present invention, I

conducted a comparative experiment, which is as follows.

<Preparation of organic fine particles F having cross-linking structure and acidic group>

A water-soluble polymer (300 parts) in which methacrylic acid/sodium p-styrenesulfonate was 70/30 and 30 parts of sodium sulfate were dissolved in 6,595 parts of water and placed in a polymerization vessel equipped with a stirrer of a paddle type. After that, 15 parts of 2,2'-azobis(2,4-dimethylvaleronitrile) was dissolved in 2,700 parts of methyl acrylate and 300 parts of divinylbenzene, placed in a polymerization vessel and subjected to a suspension polymerization at 60°C for 2 hours under a stirring condition of 400 rpm to give material fine particles (f) in a polymerization rate of 87%. Said material fine particles (100 parts) were dispersed in 900 parts of deionized water, 100 parts of potassium hydroxide was added thereto, the mixture was subjected to a hydrolyzing treatment at 90°C for 2 hours and the resulting polymer was washed with deionized water, dehydrated and dried to give organic fine particles F having cross-linking structure and acidic group. In said organic fine particles F, average particle size was 43  $\mu\text{m}$ , amount of acidic group was 4.5 mmol/g, amount of metal ion-bonded carboxyl group was 3.6 mmol/g and amount of potassium ion was 3.5 mmol/g.

[Example A and Comparative Example B]

The organic fine particles F, glass fiber as inorganic fiber, Bi-PUL as pulp-shaped fiber and VPB-105 as thermally adhesive fiber in the ratio as shown in Table below were dispersed in water to prepare aqueous slurries of 0.5% concentration. Each of the aqueous slurries was made into paper using a square-shaped sheet machine

manufactured by Kumagai Riki Kogyo Co., Ltd., sandwiched between filter papers and dried at 145°C using a rotary drier manufactured by Kumagai Riki Kogyo Co., Ltd. to prepare moisture absorptive and desorptive paper. The water used in preparation of aqueous slurry and paper-making was deionized water having non-potassium cation concentration of 0.5ppm for Example A, and water having non-potassium cation concentration of 5ppm for Comparative Example B, which water has been prepared by adding calcium carbonate to said deionized water. The resulting moisture absorptive and desorptive paper was subjected to measurement of saturated moisture absorptive rate according to the method as described in the present specification. Results of evaluation are shown in Table below.

		Example A	Comparative Example B
Material paper	Glass fiber [%]	21.5	21.5
	Bi-PUL [%]	25	25
	VPB-105 [%]	3.5	3.5
	Organic fine particles F [%]	50	50
Non-potassium cation concentration [ppm]		0.5	5
Saturated moisture absorption rate [%]		20.2	14.1

As is obvious from the Table, by making non-potassium cation concentration in water not more than 1ppm, saturated moisture absorption rate of the obtained paper is greatly improved, which is an unexpected result caused by the present invention.

The undersigned declares that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 24 day of March, 2011

  
Ryosuke NISHIDA